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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/675,207	09/30/2003	Kevin Lancon	Flowserve C-94	9935

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EXAMINER	
PRUCHNIC, STANLEY J	
ART UNIT	PAPER NUMBER
2859	

DATE MAILED: 09/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No.	Applicant(s)	
	10/675,207	LANCON ET AL.	
	Examiner	Art Unit	
	Stanley J. Pruchnic, Jr.	2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 August 2005 and 29 August 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 5-22 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 5-22 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 02 August 2005 has been entered.

Response to Arguments

2. Applicant's arguments with respect to claims 5-22 (having canceled claims 1-4) have been considered but are moot in view of the new ground(s) of rejection.

3. Applicant's arguments, see **REMARKS**, filed 02 August 2005, with respect to the rejection(s) of claim(s) 1-22 under 35 USC § 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of the same prior art and previously cited prior art (Kataoka *et al.*).

Oath/Declaration

4. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application, by application number and filing date, is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

The full name of each inventor (family name and at least one given name together with any initial) has not been set forth.

Applicant has already acknowledged the intention to meet this requirement later.

Claim Objections

5. Claims 13 and 19 are objected to because of the following informalities:

- In Claim 13, Line 4, please delete "are" before "moved" in order to correct an obvious grammatical error.
- In Claim 19, Line 2, perhaps inset --temperature-- after "detecting" in line 2 in order to clearly describe the invention.
- Claim 6-10 are objected to because they each depend from a canceled claim. Applicant is required to cancel these claims or change their dependencies to depend from independent claim(s). For consideration as to the merits, Claims 6, 8, 9 and 10 have been considered to depend from Claim 5.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 5-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,260,004 B1 (Hays; Coy L. et al., hereinafter HAYS) in view of US 5,041,989 A (Kataoka et al. hereinafter KATAOKA) and US 6,078,874 A (Piety; Richard W. et al.) et al. hereinafter PIETY).

HAYS discloses ***or suggests*** a method for **monitoring the operating conditions** on one or more units, or of a plurality of units, of rotating equipment 14 (which may be a pump 14; Col. 10, Lines 18-26; Col. 21, Lines 10-22, within a facility, said rotating equipment including relatively rotatable parts which comprise a rotating shaft (Col. 2, Lines 56-59), bearings (Col. 2, Lines 59-62; Col. 14, Lines 5-7) which support the shaft and a shaft seal assembly ***comprising a mechanical seal cooperating with said shaft which prevents leakage of said process fluid*** (Col. 13, Lines 19-25) along said shaft,

said seal arrangement including passages therein containing ***a passage fluid supplied to said mechanical seal***,

said rotating equipment having **exterior surfaces** **which have** ***surface temperatures which indicate the respective operating temperatures of the bearings and the shaft seal assembly***, the method comprising the steps of:

providing a **portable temperature data collector** ("portable hand-held data logging device" 142; Col. 17, Lines 64-67) which is manually movable within said facility by an operator, said temperature data collector including a temperature sensor which is **manually positionable** adjacent to said exterior surfaces to detect said surface temperatures of said exterior surfaces and which generates temperature data indicating said surface temperatures detected thereby, said sensor communicating with a **data storage unit** 56 which receives and stores said temperature data for subsequent analysis;

defining **temperature sensing locations** on said rotating equipment respectively corresponding with each of said rotatable parts wherein said surface temperature on said rotating equipment at each said sensing location indicates the operating temperature of said respective rotating part corresponding thereto;

performing a **temperature data collection procedure** on said rotating equipment at **a collection time** to determine the **operating temperatures** of said respective rotatable parts at said collection time, said temperature data collection procedure comprising the steps of

manually **transporting said temperature data collector** within said facility to an equipment location **proximate each said unit** of said rotating equipment being monitored,

manually **positioning said temperature sensor** adjacent to a plurality of said sensing locations,

detecting said surface temperatures of said exposed surfaces at said plurality of said sensing locations with said temperature sensor and

generating said temperature data corresponding to each of said sensing locations,

storing said temperature data in said data storage unit 56, and

manually removing said temperature data collector from each said equipment location after obtaining said temperature data for said sensing locations within said equipment location;

repeating said data collection procedure at subsequent collection times to detect and store said temperature data for each said collection time wherein said collection times are **spaced from each other by selected time intervals** and said temperature data collector is transported to each said equipment location and then removed therefrom at the end of each said data collection procedure;

storing said temperature data associated with each of a plurality of collection times to develop **historical data for each said sensing location**; and

analyzing said historical data (Col. 12, Lines 34-52) by comparing the temperature data from a last said temperature data collection procedure with the temperature data from a prior said data collection procedures to identify abnormal changes in said operating temperatures of parts (further regarding Claim 5, it would have been obvious to choose any of the previous sets of measured data in order to determine or sense that a temperature change has occurred; and

operating said rotating equipment in response to any said abnormal changes identified by said analysis (Col. 15, Lines 1-15) in said bearings and/or said shaft seal assembly. HAYS teaches determining temperature changes of bearings. The use of "and/or" in the claim does not require analysis to also include temperature of a shaft seal assembly.

Further regarding Claim 16: HAYS includes the step of **providing a processing unit** (*e.g.,* a host computer 236; Col. 17), which receives said temperature data and analyzes said historical data. Further regarding Claims 17 and 18: HAYS discloses or suggests a step of **transferring said temperature data to said processing unit** after each said temperature data collection procedure, **connecting said temperature data collector to said processing unit** for said transferring of said temperature data (Col. 18, Lines 1-35).

HAYS, as described above, discloses providing a **manually positionable** data collector, but does not explicitly disclose said data collector is a temperature data collector including **a temperature sensor** which generates temperature data indicating said surface temperatures as claimed by Applicant in Claim 15, and wherein said data collection procedure includes **detecting said surface temperatures** of said exposed surfaces at said plurality of said sensing locations with said temperature sensor.

Further regarding **Claims 19 and 20**: HAYS, as described above, discloses the sensor is **a portable sensor**, but does not explicitly disclose the method wherein **one said sensor** is used for detecting {temperature at} a plurality of said sensing locations and wherein said portable sensor is **manually directed** toward each said (temperature) sensing location to detect said surface temperatures.

Further regarding **Claims 21 and 22**: Hays discloses vibration monitoring systems are available in portable "walk around" versions, understood in the art to be used as claimed by Applicant, wherein each data collection procedure at each said collection time includes positioning said sensor at a plurality of said equipment locations corresponding to plurality of units of said rotating equipment such that said data for each said collection time relates to said plurality of said units of said rotating equipment. In such systems, data for said plurality of said units of said rotating equipment is stored

in said data storage unit until the end of said data collection procedure as claimed by Applicant in Claim 22. But HAYS, as described above, does not explicitly disclose the method applied to the **temperature data collection procedure** as claimed by Applicant in Claims 21 and 22.

Further regarding claims 5 and 15, the surfaces being adjacent or associated with said **bearings** and with said shaft **seal assembly**, HAYS as described above, teaches determining temperature changes of bearings, not seal assemblies.

KATAOKA discloses (Fig. 4; Col. 4, Lines 27-68) that it is known in the art of rotary machine maintenance to judge the operating state of a mechanical seal on the basis of measured changes in temperature.

KATAOKA is evidence that ordinary workers in the field of rotary machine maintenance would recognize the benefit of using temperature of seals as taught by **KATAOKA** for the temperature bearings of HAYS in order to judge the operating state of a mechanical seal on the basis of measured changes in temperature.

Moreover, changing the location of the measuring location from the bearing position shown by HAYS to a location associated with shaft seal assemblies, absent any criticality, is also considered an obvious modification of the HAYS method that a person having ordinary skill in the art at the time the invention was made would be able to provide using routine experimentation since the courts have held that there is no invention in shifting the position of a structure to a different position if the operation of the device would not be thereby modified. In re Japikse, 86 USPQ 70 (CCPA 1950). In this instance, the operation of the method would be unchanged, since the method still functions to determine changes indicating need for maintenance, or indicating an abnormal temperature condition.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute a surface having a temperature related to a shaft seal for the surface having a temperature related to a bearing of HAYS in order to determine that a temperature change of the shaft seal exists in order to judge the operating state of a mechanical seal on the basis of measured changes in temperature as taught by **KATAOKA**.

HAYS and KATAOKA, to summarize, is shown to teach all of the limitations as claimed by Applicant, with the exception of the temperature data collection procedure includes providing a temperature data collector including a portable temperature sensor that is manually directed toward each of a plurality of sensing locations having surface temperatures which indicate the respective operating temperatures of the *bearings and the shaft seal assembly* as claimed by Applicant.

PIETY discloses that a portable bearing temperature sensor and a portable vibration sensor are art recognized equivalent sensors for periodically measuring operating characteristics useful in predictive maintenance programs for rotating machines (Col. 1, Lines 25-45; Col. 3, Lines 8-12; Col. 6, Lines 7-18).

PIETY discloses it is known in the art to include a portable bearing temperature sensor in addition to a portable vibration sensor in a method for monitoring the operating conditions of units of rotating equipment (Col. 3, Lines 8-12; Col. 6, Lines 26-38).

PIETY further discloses that it is advantageous to include a portable bearing temperature sensor in addition to a portable vibration sensor in order to benefit from the ability to sense different machine characteristics (Col. 6, Lines 26-38).

PIETY is evidence that ordinary workers in the field of predictive maintenance would recognize the benefit of using a temperature sensor as taught by PIETY for the vibration sensor of HAYS in order to benefit from the ability to sense different machine characteristics.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute or add a temperature sensor for the vibration sensor of HAYS in order to benefit from the ability to sense different machine characteristics as taught by PIETY.

When the method of HAYS is modified to use a temperature sensor as taught by PIETY, the one said sensor is used for detecting a plurality of said sensing locations and said portable sensor is manually directed toward each said (temperature) sensing location as taught by PIETY to detect said surface temperatures in order to measure the

surface temperatures of the respective locations providing the respective operating temperatures of the *bearings and the shaft seal assembly* as taught by KATAOKA.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art cited in the form PTO-892 and not mentioned above disclose related operating condition monitoring devices and methods:

These are cited for teachings on non-contact infrared temperature measurement:

- US 5637871 A (Piety; Kenneth R. et al.);
- US 5386117 A (Piety; Kenneth R. et al.); and
- US 4814870 A (Crall; Richart F.).

These are cited for related teachings on temperature monitoring of seals:

- US 6082737 A (Williamson; Guy Gardner et al.);
- US 6626436 B2 (Pecht; Glenn G. et al.); and
- US 6325377 B1 (Williamson; Guy Gardner et al.).

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stanley J. Pruchnic, Jr., whose telephone number is **(571) 272-2248**. The examiner can normally be reached on weekdays (Monday through Friday), the best hours being from 8:30 AM to 4:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez (Art Unit 2859) can be reached at **(571) 272-2245**. The Central FAX Number for *all official USPTO communications* is **571-273-8300**.

Any inquiry of a general nature or relating to the status of this application or proceeding may be directed to the official USPTO website at **http://www.uspto.gov/** or you may call the **USPTO Call Center** at **800-786-9199** or 703-308-4357. The Technology Center 2800 Customer Service FAX phone number is (703) 872-9317.

The cited U.S. patents and patent application publications are available for download via the Office's PAIR. As an alternate source, all U.S. patents and patent application publications are available on the USPTO web site (www.uspto.gov), from the Office of Public Records and from commercial sources.

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Stanley J. Pruchnic, Jr.
9/12/05